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Title of Invention	The monitor rotation apparatus of the car audio / video system.



### Abstract

The invention relates to the monitor rotation apparatus of the car audio / video system.

If the MICOM (30) outputs the forward rotation signal and derotation signal according to after letting be on the power button (PWR) of the switch (10), user press the left turn button (L1) or the rotate right button (R1), the motor driver (20) rotates forwardly the motor (M) and it turns to the left the monitor (21) in the prescribed angle range (for example, 10°) or it rotates reversely the motor (M) and the invention lets turn to the right the monitor (21) in the prescribed angle range (for example, 10°). And if the left turn limit switch (L2) and rotate right limit switch (R2) are turned on according to while user presses the left right panning button (L1,R1), completely turn to the left to the prescribed angle range that the monitor (21) is decided or turn to the right, the motor (M) automatically stops.



### Representative Drawing(s)

Fig. 1



### Keyword(s)

The car audio video system, the car A / V system, and the monitor rotation apparatus.



## Description

### ■ Brief Explanation of the Drawing(s)

Figure 1 is a circuit diagram showing the monitor rotation apparatus of the car audio / video system according to the present invention

Figure 2 is flowchart showing the operation state of the monitor rotation apparatus of the car audio / video system according to the present invention

Figure 3 is a front view of the monitor rotation apparatus of the car audio / video system according to the invention

Figure 4 is a right side cross-sectional view of the monitor rotation apparatus of the car audio / video system according to the invention

Figure 5 is a plane view at the A-A' cut out part of fig. 4.

The description of the denotation about the main part of the drawing.

10: switch M: motor.

20: motor driver 21: monitor.

22: monitor bracket 23: rotary guide panel.

23a: rotate right restriction 23b: left turn restriction.

23c: the rotate right limit protrusion 23d: the left turn limit protrusion.

24: rubber friction pulley 25: follower friction pulley.

G1: driving gear G2,G3,G4,G5: mid-gear.

G6: slave gear L1: left turn button.

L2: left turn limit switch PWR: power button.

R1: it buttons the rotate right R2: rotate right limit switch.

30: MICOM.

### ■ Details of the Invention

### ■ Purpose of the Invention

■ The Technical Field to which the invention belongs and the Prior Art in that Field

The invention relates to the car audio / video system. And it is about the monitor rotation apparatus of the car audio / video system which more particularly can rotate the LCD monitor of the car audio / video system.

Generally, there is a problem that as to the conventional car audio / video system, the visibility looking at the monitor screen as the optimum condition is limited according to the location of the man which sits on the front seat or the back seat because of being fixed so that in the LCD monitor in which TV is watched or watching VCD, rotation impossible.

■ The Technical Challenges of the invention

Therefore, the present invention is to provide the monitor rotation apparatus of the car audio / video system which the above-described conventional problem is overcome, and therefore, the object of the present invention can rotate the LCD monitor of the car audio / video system the right and left in the predetermined angular range.

It is composed of the power button, the left turn button and rotate right button and the monitor rotation apparatus of the car audio / video system for achieving the object of the present invention is composed of the power on/off signal, the monitor left turn on/off signal and the switch outputting the monitor rotate right on/off signal, the motor driver, and MICOM. The motor driver, lets turn to the right monitor in the prescribed angle range the motor is reversely rotated the reverse rotation drive voltage is outputted the derotation signal is inputted monitor is to the left turned in the prescribed angle range the motor is forwardly rotated the forward rotation driving voltage is outputted the forward rotation signal is inputted the left turn limit switch which is turned on it completely turns to the left to the angular range that monitor is decided the motor rotates in the forward direction, and the rotate right limit switch which is turned on if it completely turns to the right to the angular range that monitor is decided as the motor rotates reversely. MICOM stops the operation of the motor while it outputs the forward rotation signal if the signal coming the left turn is inputted to the state where the power on signal of the switch is inputted and outputting the right-turn signal if the signal coming the rotate right is inputted if the left turn limit switch and rotate right limit switch are turned on.

If MICOM outputs the forward rotation signal and derotation signal according to after letting be on the power button of the switch, user press the left turn button or the rotate right button, the motor driver rotates forwardly the motor and it turns to the left monitor in the prescribed angle range (for example, 10°) or it rotates reversely the motor and the monitor rotation apparatus of the car audio / video system of the present invention according to the configuration as described above lets turn to the right monitor in the prescribed angle range (for example, 10°). And if the left turn limit switch and rotate right limit switch are turned on according to while user presses the left right panning button, completely turn to the left to the prescribed angle range that monitor is decided or turn to the right, the motor automatically stops.

■ Structure & Operation of the invention

Hereinafter, it referring to the figure particularly decides to explain.

Referring to figures 1 and 3, it is composed of the power button (PWR), the left turn button (L1) and rotate right button (R1) and the switch (10) outputs the power on/off signal, the monitor left turn on/off signal and monitor rotate right on/off signal.

If the forward rotation signal is inputted, by outputting the forward rotation driving voltage and rotating forwardly the motor (M) it turns to the left the monitor (21) in the prescribed angle range and if the derotation signal is inputted, by outputting the reverse rotation drive voltage and rotating reversely the motor (M) the motor driver (20) lets turn to the right the monitor (21) in the prescribed angle range.

If it completely turns to the left to the angular range that the monitor (21) is decided as the motor (M) rotates in the forward direction, the left turn limit switch (L2) is turned on.

If it completely turns to the right to the angular range that the monitor (21) is decided as the motor (M) rotates reversely, the rotate right limit switch (R2) is turned on.

In the state where in the MICOM (30), the power on signal of the switch (10) is inputted, if the signal which outputs the forward rotation signal if the signal coming the left turn is inputted and comes the rotate right is inputted, the right-turn signal is outputted. And the operation of the motor (M) is stopped if the left turn limit switch (L2) and rotate right limit switch (R2) are turned on.

Referring to figures 4 and 5, it is supported with the monitor bracket (22) and the monitor (21) holds up. And the monitor bracket (22) is combined the right and left in the predetermined angular range (for example, 10°) with the rotary guide panel (23) revolving.

The torque of the motor (M) is delivered after a series of mid-gear (G2,G2,G4,G5), going in gear with the driving gear (G1) of the motor (M) the slave gear (G6), going in gear with the mid-gear (G2,G2,G4,G5) a series of rubber friction pulley (24) and the follower friction pulley (25) revolving with the slave gear (G6) to the rotary guide panel (23). And it rotates left and rights in the angular range of the monitor (21) drawing 10° if the rotary guide panel (23) accordingly rotates left and rights in the angular range of 10°.

If it completely turns to the right to the angular range (10°) in which the monitor (21) is decided with the torque of the motor (M), the rotate right limit protrusion (23c) formed in the end part of the rotate right restriction (23a) of the rotary guide panel (23) lets be on the rotate right limit switch (L2).

If it completely turns to the left to the angular range (10°) in which the monitor (21) is decided with the torque of the motor (M), the left turn limit protrusion (23d) formed in the end part of the left turn restriction (23b) of the rotary guide panel (23) lets be on the left turn limit switch (R2).

The monitor rotation apparatus of the car audio / video system according to the present invention runs with the configuration as described above like next.

Referring to Figure 2, the MICOM (30) initially distinguish whether the power button (PWR) of the switch (10) was turned on. And if it is discriminated because the power button (PWR) was turned on, distinguish (S10) whether the left turn button (L1) of the switch (10) was firstly turned on (S11).

Subsequently, in the state where the power button (PWR) is turned on, if it is discriminated because the left turn button (L1) was switched off, the MICOM (30) distinguish whether the rotate right button (R1) of the switch (10) was turned on or not (S12).

If the left turn button (L1) is if turned on in the state where the power button (PWR) is turned on, the MICOM (30) outputs the forward rotation signal for turning to the left the monitor (21). And if the forward rotation signal outputted from the MICOM (30) is inputted to the motor driver (20), the motor driver (20) rotates forwardly the motor (M).

Therefore, the torque of the motor (M) is delivered through the driving gear (G1), the mid-gear (G2,G3,G4,G5) and slave gear (G6) to the rotary guide panel (23). And as the rotary guide panel (23) consequently turns to the left, it unites with the rotary guide panel (23) and it is connected and the monitor bracket (22) supporting the monitor (21) together turns to the left and the monitor (21) is to the left turned (S13).

On the contrary, in the state where the power button (PWR) is turned on, if the rotate right button (R1) is turned on, the MICOM (30) outputs the derotation signal for letting turn to the right the monitor (21). And if

the derotation signal outputted from the MICOM (30) is inputted to the motor driver (20), the motor driver (20) rotates reversely the motor (M).

Therefore, the torque of the motor (M) is delivered through the driving gear (G1), the mid-gear (G2,G3,G4,G5) and slave gear (G6) to the rotary guide panel (23). And as the rotary guide panel (23) consequently turns to the right, it unites with the rotary guide panel (23) and it is connected and the monitor bracket (22) supporting the monitor (21) together turns to the right and the monitor (21) is turn to the right let (S14).

As described above, while the motor (M) rotates in the forward direction, the monitor (21) turns to the left or the motor (M) rotates reversely, the monitor (21) turns to the right, distinguish whether the left turn button (L1) is switched off or not the MICOM (30) distinguish (S15) whether the rotate right button (R1) is switched off (S16).

If the left turn button (L1) or the rotate right button (R1) is off let if after user rotates the monitor (21) in the prescribed angle range ( $10^\circ$ ) at the appropriate angle, the MICOM (30) stops the operation of the motor (M) (S19).

But distinguish with the left turn limit protrusion (23d) formed in the left turn restriction (23b) of in the left turn button (L1) or the MICOM (30), use the rotary guide panel (23) the rotate right button (R1) is not off let and it and then lets be on whether the rotate right limit switch (R2) is turned on with the rotate right limit protrusion (23c) formed in the rotate right restriction (23a) of the rotary guide panel (23) distinguish (S17) whether the left turn limit switch (L2) is turned on or not or not (S18).

At this time, if the left turn limit switch (L2) or the rotate right limit switch (R2) keeps OFF-state as the monitor (21) revolves in the prescribed angle range ( $10^\circ$ ), it continuously rotates in forward and reverses directions the motor (M) and the MICOM (30) lets turn to the right the monitor (21) as the left turn.

On the other hand, if as the monitor (21) completely revolves to the prescribed angle range ( $10^\circ$ ), the left turn limit switch (L2) is turned on with the left turn limit protrusion (23d) or the rotate right limit switch (R2) is turned on with the rotate right limit protrusion (23c), the MICOM (30) stops the operation of the motor (M) (S19).

#### ■ Effects of the Invention

As described above, the monitor rotation apparatus of the car audio / video system according to the present invention has the effect that the LCD monitor of the car audio / video system can be rotated the right and left in the predetermined angular range (for example, side-to-side,  $10^\circ$ ). Therefore the visibility looking at the monitor screen according to the location in which man sits as the optimum condition is improved.

In the above, it noes more than than one working example for enforcing the monitor rotation apparatus of the car audio / video system according to the present invention to explain. The invention is not limited to the above-described working example. If without escaping the gist of the present invention claimed in the range of the patent claim of less than, it suffers and it grows in the field in which invention belongs, the various change execution will possible or anyone.



#### Scope of Claims

##### Claim 1 :

MICOM which stops the operation of the motor (M) while it outputs the forward rotation signal if the signal coming the left turn is inputted to the state where the power on signal of the rotate right limit switch (R2), which is turned on if it completely turns to the right to the angular range that the monitor (21) is decided as the power button (PWR), the left turn button (L1) and the left turn limit switch (L2) which is turned on if it is composed of the rotate right button (R1) and it completely turns to the left to the angular range that the monitor (21)

is decided as the power on/off signal and monitor left turn on/off signal and the switch (10), outputting the monitor rotate right on/off signal and the motor driver (20) which lets turn to the right the monitor (21) in the prescribed angle range by the reverse rotation drive voltage is outputted if the monitor (21) is to the left turned in the prescribed angle range by the forward rotation driving voltage is outputted if the forward rotation signal is inputted and rotating forwardly the motor (M) and, the derotation signal is inputted and rotating reversely the motor (M), and the motor (M) rotate in the forward direction, and the motor (M) rotate reversely and switch (10) is inputted and outputting the right-turn signal if the signal coming the rotate right is inputted if the left turn limit switch (L2) and rotate right limit switch (R2) are turned on (30)

The monitor rotation apparatus of the car audio / video system wherein it is composed of.

#### Claim 2 :

The monitor rotation apparatus of the car audio / video system, wherein the torque of the motor (M) as to the first claim it unites with a series of mid-gear (G2,G2,G4,G5), going in gear with the driving gear (G1) of the motor (M) the slave gear (G6), going in gear with the mid-gear (G2,G2,G4,G5) a series of rubber friction pulley (24) revolving with the slave gear (G6) and the monitor bracket (22) supporting the monitor (21) after the follower friction pulley (25) and supports and it is delivered to the rotary guide panel (23) revolving the right and left in the predetermined angular range; and the rotate right limit protrusion (23c) formed in the end part of the rotate right restriction (23a) of the rotary guide panel (23) and the left turn limit protrusion (23d) formed in the end part of the left turn restriction (23b) of the rotary guide panel (23) let be on the rotate right limit switch (L2) and left turn limit switch (R2) if it completely turns to the right to the angular range that the monitor (21) is decided with the torque of the motor (M) or it turns to the left.



Drawings

Fig. 1

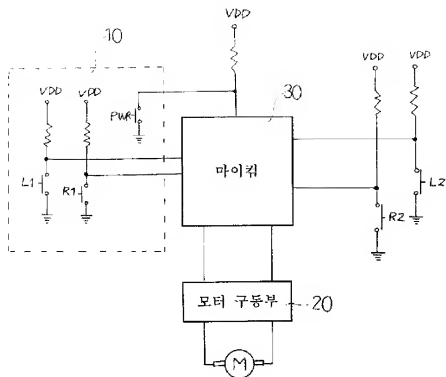


Fig. 2

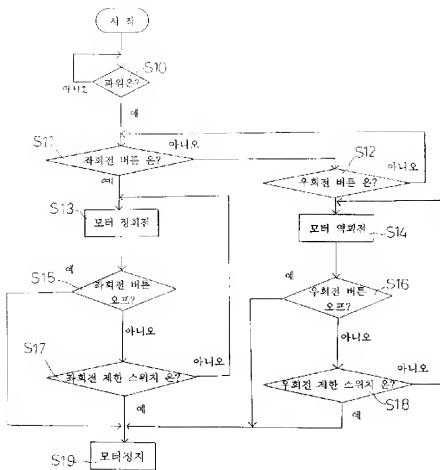


Fig. 3



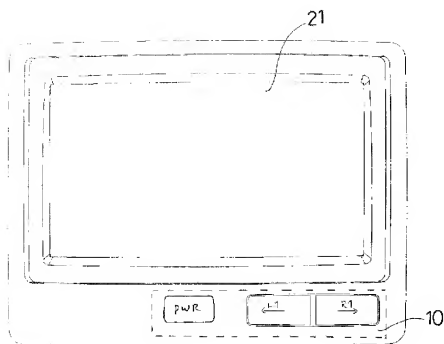


Fig. 4

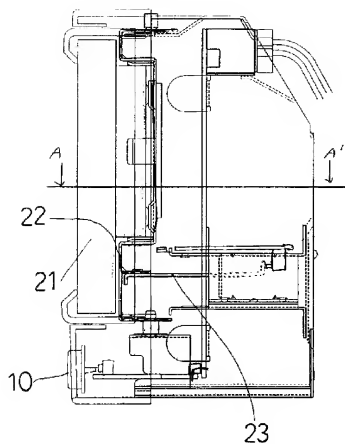


Fig. 5

